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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/036,623	11/07/2001	John Nicholas Wilson	450110-03581	5839

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EXAMINER	
TRAN, KHANH C	
ART UNIT	**PAPER NUMBER**
2631	

DATE MAILED: 09/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/036,623	WILSON ET AL.	
	Examiner	Art Unit	
	Khanh Tran	2631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 July 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9,11-23 and 25-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4,11,15,18 and 26-29* is/are rejected.

7)☒ Claim(s) *2,3,5-9,12-14,16,17,19-23 and 25* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. The Amendment filed on 07/07/2005 has been entered. Claims 1-9, 11-23 and 25-29 are pending in this Office action.

Response to Arguments

2. Applicant's arguments, see pages 14-15, filed on 07/07/2005, with respect to the rejection(s) of claim(s) 1-2, 4, 10-11, 15-16, 18, 24 and 26-29 under 35 U.S.C 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Karim et al. U.S. Patent 6,501,810, Lee U.S. 6,373,861 B1 and Raphaeli et al. U.S. Patent 6,614,864 B1.

2. The objection of claims 2 and 29 has been withdrawn after claims being amended to correct informalities.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 4, 11, 15, 18 and 26-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Karim et al. U.S. Patent 6,501,810 in view of Lee U.S. 6,373,861 B1 and Raphaeli et al. U.S. Patent 6,614,864 B1.

Regarding claim 1, Karim et al. does not disclose a plurality of data bearing signal samples and a plurality of guard signal samples before or after the data bearing signal samples as set forth in the application claim.

As recited in the last Office action, Lee discusses in column 6, lines 8-26, Lee invention is directed to a frequency synchronizing device for OFDM/CDMA communication system which exchanges data using an OFDM frame including OFDM symbols each comprised of a plurality of data samples, and a guard interval inserted at the head of each symbol to prevent interference between the symbols. Furthermore, in column 1 line 40 via column 2 line 20, the chip data spread by the spreaders 101 is input to a summer 102 after pilot signal insertion (not shown). The chip data is summed in the summer 102 on a chip unit basis and is output in series to a serial/parallel converter 103. The serial/parallel converter 103 outputs the serial chip data provided from the summer 102 in parallel. Further, the parallel sample data is input to an inverse fast Fourier transform (IFFT) device 104, which performs OFDM modulation on the chip data. In other words, the IFFT device 104 performs IFFT on the chip data, and carries the processed chip data on different sub-carriers having orthogonality in a frequency domain. The guard interval is data obtained by copying some sample data at the rear of an OFDM symbol comprised of N data samples, and is inserted at the front of the OFDM symbol. Herein, the data in which a guard interval is inserted on an OFDM

symbol unit basis, is defined as an OFDM frame. Because OFDM frame includes guard interval is well known in the art of multi-carrier modulation, it would have been obvious for one of ordinary skill in the art at the time of the invention that Karim et al. teachings can be modified to received OFDM frame as discussed in Lee invention.

Referring to Karim et al. invention, figure 3 illustrates a receiver and figure 4 discloses a synchronization circuit to be used in conjunction with the receiver of figure 3. The synchronizer 309 in figure 4 includes a cyclic prefix correlator 402 identifies among the samples the start of a frame; see column 4, lines 45-65.

Karim et al. does not discuss the matched filter as claimed by Applicants. Nevertheless, Raphaeli et al. teaches a similar OFDM receiver for acquiring synchronization in which a correlator in the receiver employs a matched filter having a template of the spreading waveform pattern; see column 4, lines 10-40. Because it is known that matched filter and correlator are used interchangeably because they produce the same result, it would have been obvious for one of ordinary skill in the art at the time of the invention that Karim et al. cyclic prefix correlator 402 can be modified to employ a matched filter as taught in Raphaeli et al. invention. The template of the spreading waveform pattern would correspond to the claimed impulse response and the cyclic prefix would correspond to the claimed guard signal samples.

Referring back to Karim et al. invention, the synchronizer 309 in figure 4 is operable to control the cyclic prefix correlator 402. In column 4, lines 25-50, synchronizer 309 detects the incoming pulses from the A/D converters 301 and 302 and sends a pointer to the data clock recovery unit 311 indicative of the position of a frame

start pulse with respect to reference clock 319. The position of a frame start pulse corresponds to the claimed location of a sync position. The receiver in figure 3 further includes an FFT 305 for extracting the frequency components of the received signal within the frame window.

Regarding claim 4, in column 4 line 50 via column 5 line 20 of Karim et al. invention, the cyclic prefix correlator identifies among these samples the one corresponding to the start of a frame P1. Thus, the output from correlator 402 is a pointer P1 identifying the count, or time, of the A/D sample corresponding to the start of frame as shown in FIG. 2. The A/D converters use the clock pulses from clock 418 to extract the sequence of consecutive bits contained within the digital transmission. The cyclic prefix correlator 402 detects the time position of the frame start within the sequence of consecutive bits from the A/D converters. Clock 418 supplies a count indicative of the time interval during which the frame start is detected by cyclic prefix correlator 402. The count output by cyclic prefix correlator 402 is stored in memory 406, after being compared by comparator 404 to the "predicted" value. Memory 406 stores 36 counts indicative of the time interval during which the frame start was detected.

Regarding claim 11, the receiver in Karim et al. invention is an OFDM receiver.

Regarding claim 15, claim 1 comprises elements performing all the steps of claim 15, therefore, claim 15 is rejected on the same ground as for claim 1.

Regarding claim 18, claim 4 comprises elements performing all the steps of claim 18, therefore, claim 18 is rejected on the same ground as for claim 4.

Regarding claim 26, with all the elements of claim 1 being taught by Lee, one of ordinary skill in the would have recognized that those elements can be implemented as a computer program loaded onto a computer to operate the frequency synchronizing device as taught in Lee invention. The motivation for doing that is to simulate the device before implemented on hardware.

Regarding claim 27, using analogous reasoning as in claim 26, one of ordinary skill in the would have recognized that those elements can be implemented as a computer program loaded onto a computer to perform the method steps of the frequency synchronizing device as taught in Lee invention. The motivation for doing that is to simulate the steps before implemented on hardware.

Regarding claims 28-29, as well known in the art, a computer hard drive can be used to record the computer instructions as claimed in claims 26-27.

Allowable Subject Matter

4. Claims 2-3, 5-9, 12-14, 16-17, 19-23 and 25 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in

independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Usui U.S. Patent 6,393,077 B1 discloses "Correction Detecting Device And Its Method".

Schmidl et al. U.S. Patent 6,546,055 B1 disclose Carrier Offset Determination For RF Signals Having A Cyclic Prefix".

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khanh Tran whose telephone number is 571-272-3007. The examiner can normally be reached on Monday - Friday from 08:00 AM - 05:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KCT

Khanhcong Tran 09/16/2005

Examiner KHANH TRAN